SECTION 02538

SANITARY SEWER SYSTEMS

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LANL MASTER CONSTRUCTION SPECIFICATION

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the Engineering Standards Manual (ESM) Civil POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General requirements.

Delete information within "stars" during editing.

Specification developed for ML-3 / ML-4 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site piping, fittings, manholes, and accessories beyond 5 feet of building wall.

1.2 LANL PERFORMED WORK

A. LANL's Support Services Subcontractor (SSS) will tie into existing systems which include sanitary sewer lines, septic tanks, treatment plants, lift stations, and manholes.

B. SSS will inspect interior of new and existing sanitary sewer lines (accessible by camera) with video camera for piping integrity and proper installation both before tie-in and at turnover.

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AE shall coordinate with LANL Projects Manager to ensure an approved WPF (Waste Profile Form) for all anticipated wastewater has been submitted to the LANL Utility Water Wastewater representative prior to completion of design.

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C. LANL Construction Inspector will ensure all drains or buildings connected to the sanitary wastewater system have an approved WPF (Waste Profile Form) for all anticipated wastewater. Documentation shall be submitted to the LANL Utility Group wastewater representative prior to utility tie-in. http://enterprise.lanl.gov/forms/1346.pdf

D. LANL Construction Inspector will coordinate all required inspections and tie-ins.

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01330, Submittal Procedures:

1. Catalog data on pipe materials, fittings and accessories, directional drilling pull (weak link) device, and casing seals.

2. Certifications of welders qualified for heat fusion polyethylene joints.

3. Submittals for the Horizontal Directional Drilling.

1.4 QUALITY ASSURANCE

A. Welders Certifications and Qualified Procedure Standards

1. Plastic Pipe: 49CFR192.283 and 192.285, and Driscopipe heat fusion qualification guide.

PART 2 PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Alternate products may be accepted; follow Section 01630, Product Options and Substitutions.

2.2 SANITARY SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING

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NOTE: Consult with a LANL Utilities Group wastewater representative for approval when selecting piping material beyond 5 feet of the building and under roads. Under roadways will require ductile iron or metallic pipe sleeve with spacers.
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A. Ductile Iron Pipe: AWWA C151, Class 150.

1. Joints: Bell and spigot, AWWA C111 rubber gaskets.

2. Fittings: AWWA C110, Ductile-Iron or Gray-Iron, Class 350 or AWWA C153, Ductile-Iron Compact Fittings, Class 350.

B. PVC Pipe and Fittings: ASTM D3034, SDR 35.

1. Joints: Bell and spigot, ASTM D3212 rubber gaskets.

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Specify the following (2.2 C and D) for pressure systems (non-gravity)
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C. PVC Pipe: AWWA C900, Class 150 (DR 18).

1. Joints: Bell and spigot, ASTM D3212 rubber gaskets.

2. Fittings: AWWA C110, Ductile-Iron or Gray-Iron, Class 350 or AWWA C153, Ductile-Iron Compact Fittings, Class 350.

D. Ductile Iron Pipe: AWWA C151, Class 150.

1. Joints: Bell and spigot, AWWA C111 rubber gaskets.

2. Fittings: AWWA C110, Ductile-Iron or Gray-Iron, Class 350 or AWWA C153, Ductile-Iron Compact Fittings, Class 350.

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PE Pipe may be used for gravity and pressure systems.
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E. Polyethylene Pipe and Fittings.

1. Manufacturer: CP Chem Performance Pipe, [Driscoplex 4200, Iron Pipe Size] or [Driscoplex 4300, Ductile Iron Pipe Size]. Use of IPS or DIPS shall be appropriate for new system or interface with existing system.

2. Material: High density polyethylene, ASTM D3350, PE3408, SDR 15.5 (working pressure rating of 110 psi at 73 degrees F), cell classification number PE 345464C.

3. Joints: Heat fusion per manufacturer's instruction.

2.3 CLEANOUTS

A. Cleanout

1. Manufacturer: General Engineering Company, GENECO.

2. Ferrous metal top with gasketed bell to accept PVC schedule 40 or cast iron riser pipe.

3. Screw plug to be standard brass countersunk plug.

B. Riser Pipe

1. Pipe: 4 inch minimum PVC schedule 40 or heavier or cast iron.

C. Wye

1. Preformed single wye or double wye per design requirement.

2.3 MANHOLE

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Refer to Civil Drawing ST-G3020-1 for manhole detail.
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A. Provide precast concrete manhole, concrete grade rings, and ductile iron cover per Drawings and Section 02535, Manholes.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade. Do not over excavate.

3.2 PREPARATION

A. Ream pipe ends and remove burrs.

B. Remove scale and dirt on inside and outside of piping before assembly. Pipe interior shall be thoroughly cleaned of foreign material before lowering into the trench.

C. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction, or at the end of each workday, protect open ends with temporary plugs or caps.

3.3 PIPING TIE-IN

A. Tie-ins to existing piping, lift stations, manholes, and equipment will be performed by LANL's Support Services Subcontractor (SSS). Excavation, backfill, and materials required for tie-in shall be provided by Contractor. The tie-in will be inspected by the LANL Construction Inspector and the LANL Utilities Group sanitary sewer systems representative.

B. Notify LANL Construction Inspector at least 10 working days in advance to schedule tie-in of piping system and pre-tie-in video inspection described in Section 3.6. The LANL Construction Inspector will notify LANL's SSS.

C. Prior to notifying SSS, the LANL Construction Inspector will ensure materials required for tie-in are on site, service lines have been tested, and material submittals and all test reports have been approved by LANL Utilities Group.

D. Install pipe at manhole tie-ins at the same invert elevation without sags or low points. Chip manhole wall only to allow for insertion of new pipe. Caulk/seal around new pipe to provide watertight installation in manhole wall. Seal shall be per pipe manufacturers instructions, in addition to ASTM F585.

E. Sleeve and caulk pipes penetrating exterior walls below grade to provide a waterproof installation.

F. Set concrete manholes level and plumb and test manholes for leakage per Section 02535.

3.4 BURIED PIPING

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Tracer wire and test stations are required when specifying cast iron, ductile iron, and non-metallic piping. Comply with Civil Standard Drawing ST-G30GEN-3 for tracer wire/test station details and Civil Standard Drawing ST-G30GEN-4 for trenching detail.

Refer to the LANL Engineering Standards Manual Civil Chapter, Section G30 (future), for required minimum utility line clearances.

Use metallic pipe if PVC or PE sewer line pipe is installed less than 20 feet from steam and condensate lines.

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A. Refer to Drawings and Section 02310, Grading, Excavating, and Trenching, for earth cover, bedding, tracer wire, wire continuity test, warning tape, documenting new or exposed existing utility location, etc requirements.

B. Slope of service lateral from building to main shall be continuous and uniform without fittings or angled pipe joints. Slope shall be a minimum slope of 1/4 inch per foot and a maximum slope of 1/2 inch per foot. Minimum depth of cover shall be 4 feet.

C. Comply with Uniform Plumbing Code (IAPMO).

D. Route piping in orderly manner and maintain gradient.

E. Install bell and spigot pipe with bell end upstream.

F. Pressure test piping system with water or air in accordance with Section 15992.

3.5 SEWER CLEANOUT

A. Cleanouts shall consist of single or double preformed wye, riser pipe, and access top.

B. Double cleanout shall be placed at five feet from building wall.

C. Riser pipes shall be one piece extended to grade with top adapter for a countersunk threaded plug.

D. Sand bedding or fine graded backfill material shall be compacted around riser pipe.

E. Cleanouts at grade shall have concrete collars eighteen (18) square by six (6) inches thick with 6X6X10 gauge (W1.4) wire fabric reinforcement. Concrete shall be continuous at double cleanouts. Collar shall be flush with finish grade or pavement.

3.6 HORIZONTAL DIRECTIONAL DRILLING OR PIPE BURSTING

A. Crossing of paved streets or roadways or other areas, if approved by LANL Utilities group representative, may be accomplished by horizontal directional drilling (HDD) or pipe bursting, whenever practical. The HDD bore shall be kept to a maximum of 2 inches larger than the pipe. Care shall be exercised to ensure the paved surface is not damaged during the drilling operation.

B. Top of HDD shall have a minimum below grade bury depth of 48 inches and a minimum bury depth of 60 inches below any paved surface. Depth shall not exceed excavation by standard, conventional means and shall be approved by LANL Utilities group representative.

C. When pulling in pipe the pulling force shall be monitored and kept below the Allowable Tensile Load (ATL) value of the pipe size and material per manufacturers' recommendation. Both pipe ends shall be monitored for continuous, smooth movement. Pulling load from the equipment shall be monitored and the pipe lead end shall be equipped with a weak link device to disengage at the ATL or below. Manufacturers procedures and design parameters shall be followed, in addition to ASTM F1962.

D. Polyethylene pipe shall extend 3-5% of the pulled-in length past the termination points to allow for contraction. Polyethylene pipe shall be allowed 24 hours to recover from the pulling stress and contract to original pre-pull length and allowed to stabilize to buried soil temperature before final tie-ins are accomplished. A minimum of five (5) feet of pipe shall extend beyond the drilling entrance/exit hole to allow for pipe damage assessment. Tracing wire shall be pulled in with the polyethylene pipe.

3.7 LANL ACCEPTANCE INSPECTION AND TESTING

A. Notify LANL Construction Inspector at least 10 working days before tie-in to schedule video inspection of piping system. Inspection will verify that new and existing lines are clean and acceptable for tie-in to commence.

B. Notify LANL Construction Inspector at least 7 working days before system turnover to schedule second and final video inspection of piping system. The re-inspection is to assure no debris from construction activity has entered the new or existing system.

C. LANL Construction Inspector will contact LANL Utilities Group wastewater representative to obtain permit prior to system tie-in and arrange for LANL's Support Services Subcontractor video inspection of new piping (as much as is accessible) and existing system from tie-in downstream 200 feet.

END OF SECTION

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Do not delete the following reference information:

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FOR LANL USE ONLY

This project specification is based on LANL Master Construction Specification Rev. 5, dated December 1, 2004.